

assumed its normal position. There was very likely at this time a tumor in the orbit, impaction of the middle turbinate and ethmoid body, closure of exit to frontal sinus, and retention of fluid in same. The gushing of fluid followed subsidence of swelling, and thus relief from pain.

I wish here to enter a kindly criticism against the manner in which this and similar patients have been handled. Is there not here a suggestion of lack in the co-operation of brain surgeon, neurologist, rhinologist, and ophthalmologist? Had these different specialists each done their duty in complete harmony with every other one, in my judgment, this patient would have been saved two or three years of intolerable suffering, by an early and correct diagnosis, followed by correct treatment. (Patient exhibited.)

#### Discussion.

Dr. P. de Obarrio, San Francisco: It seems to me evident from the history of the case that a lack in proper examination of the patient has been the cause of a faulty diagnosis, and the lack of a proper diagnosis has been the cause of what I consider to be a disastrous treatment. In these cases there is no reason to lose the eye. The tumor could have been enucleated without the necessity of this eye being lost. Larger tumors than this one have come out and the eyes have not been lost. I have presented to the San Francisco County Medical Society on Jan. 23rd, 1912, the report of just such a case. The question of exophthalmus has undoubtedly not been taken into consideration in this case. The moment there is an increase in the volume of the tissues of the orbit there must be exophthalmus and the direction of this exophthalmus will show the location of the tumor and such investigation was not done. It seems to me that there should have been a co-operation between the surgeon and the specialist in this case and it is certainly up to the specialist to furnish information to the general surgeon if he abstains from interfering.

Dr. Cullen F. Welty, San Francisco: When a brain operation is contemplated on a case that has had cerebral manifestations for a long period, every available measure should be used in perfecting your diagnosis prior to operation. In such a case as the Doctor reports it is almost criminal negligence to do a brain operation without having the eye findings. Had this examination been made, the patient would not have been subjected to the brain operation.

Dr. Harrington B. Graham, San Francisco: I saw the operation upon this patient and one thing that impressed me was the way the sphenoid was reached. Dr. Stillman had no trouble in taking out the anterior wall of the sphenoid from the orbit and I make mention of this in a later paper. Another interesting thing that I noticed was that there was no inflammation of the ethmoids. It is easy to criticize after you have the pathological condition given you as this case has demonstrated. The probabilities were in this case before operation that it was an intra-cranial growth. I am not enough versed in the diagnosis of retro-orbital growths to be competent to criticize Dr. de Obarrio's statements. I know something about intra-nasal growths and I know that Dr. Welty is entirely wrong. I examined the patient intra-nasally and found no evidences that the ethmoids were involved at the time of the operation, so Dr. Welty's remarks are unnecessary. The operation was done by Dr. Stillman with as complete a knowledge of the case as I think could be obtained. I do not think that Dr. Stillman should be criticized so severely for undertaking an operation which in his judgment was indicated at the

time. When he found the growth was not an intra-cranial growth he did the next best thing and I think he is justified in that.

Dr. Geo. W. McCoy, Los Angeles: With diagnosis of malignant tumor in the orbit back of the eyeball, the sacrifice of the eye ought to be made, as these growths are so prone to recur. So in this case I think the removal of the eyeball was imperative, especially as sight was gone. In such cases if operative procedures are undertaken I think they should be radical.

Dr. P. A. Jordan, San Jose: In the first place I wish to clearly establish my own position with relation to the patient. I had seen the patient but twice prior to the time of operation and at both these visits I was only consultant. My hands were tied because of the peculiar home surroundings of the patient. All my dealings with the case were during the last 6 or 8 months. From stories I have gathered from the patient and other sources it would seem that 3 or 4 years ago when the trouble began, there was some trouble present in the ethmoid region pushing the middle turbinate against the septum, closing the exit of the frontal sinus, with all the pain accompanying that such conditions might cause. At this time the physician who had her in charge should have found the nasal trouble at once and should have operated and this should have led him to locate the tumor whether ethmoidal or orbital. It may have originated in the ethmoid or it may have originated in the orbit. At any rate no bony wall separated nasal and orbital cavities at time of last operation. With this as the starting point it seems to me that the trouble should have been traced to its origin and removed. The patient would thus have escaped 3 or 4 years of intolerable suffering. I criticize myself for not having gotten more deeply into the truth of the matter, but the handling of the case was difficult as the family surroundings were such that I could not get control of the case and it was difficult for the specialist, the neurologist and the general surgeon to properly work together.

### A REPORT OF TWENTY-EIGHT CASES OF TROPICAL ABSCESS OF THE LIVER.\*

By REA SMITH, M. D., Los Angeles.

Abscess of the liver is so serious a complication and so frequent a termination of amebic dysentery, that I have taken the liberty of bringing before you the following report of twenty-eight cases of liver abscess that have occurred in our practice in Los Angeles during the last ten years. One of these cases developed in Goldfield; one at Mojave, one in Arizona and the remaining twenty-five came from Mexico for surgical treatment after the disease had been diagnosed and the patient referred to us by the local physician.

Of these cases, one had a spontaneous cure by discharging through a bronchus following rupture through the diaphragm. The rupture occurred on board the train while en route to this city and he was sent directly to the hospital, coughing and expectorating liver pus.

One died of rupture into the lung before he could be moved to a hospital after being first seen by me, and two were moribund when admitted and died before any surgical relief could be afforded.

Two patients had early acute infections with

\* Read before the Forty-Second Annual Meeting of the State Society, Del Monte, April, 1912.

enormously distended livers and a great deal of thin bloody fluid. They were both operated upon in extremis; one died the day of the operation, one four days later.

One patient was operated upon in the face of general peritonitis, which had followed aspiration of the liver, in the country, before he came under our care. His abscess was drained, but the peritonitis was not affected thereby, and he died on day following the operation.

Of the remaining twenty-one cases of abscess seen between the initial acute infection and the terminal stage, 4 died and 17 recovered. A mortality of about 19% for the 21 cases, and mortality of 29.16% for the series of 24 cases operated upon. Two of these patients died of amebic abscess of the lung, one 6 weeks, and one 2 months after operation. These abscesses were metastatic with no perforation of the diaphragm. At autopsy in both cases the liver abscess was found to be a sinus the size of the tube, the cavity in each being healed.

One patient died of starvation from a duodenal fistula which developed several days after operation and was probably due to pressure necrosis produced by the drainage tube, which was necessarily placed well back on the inferior surface of the liver as the most favorable point for opening.

One died of pulmonary hemorrhage in a lung abscess that had been present at the time of operation. This patient had been under observation for some weeks, with lung abscess following rupture of liver abscess into the lung, and as he continued to lose ground we drained both liver and lung abscess through the liver. His condition improved markedly for about two weeks, at which time he had a fatal hemorrhage, demonstrated at autopsy to be from a vessel in the lung.

Clinically these cases fall naturally into two groups.

First: Those with a large quantity of pus developing in the lower segment of right lobe, and pointing downward, with the liver adherent to the abdominal wall below the margin of the ribs. The indication for opening at this point is obvious and the procedure extremely simple. Two of this series fall in this group and both had uninterrupted recoveries.

Second: Those with an abscess confined to the liver, with the liver movable; 19 of this series fall in the 2nd group. In all of these cases we opened the abdomen without the preliminary use of the exploratory needle, located the abscess by palpation, and arranged for free drainage at the most accessible point. We found all of these abscesses high in the right lobe, many of them lying close to the diaphragm, with the one exception mentioned, followed by a duodenal fistula. Unless the liver was adherent at some point to the peritoneum, we treated them by removing the 9th and 10th costal cartilages at the upper angle of the abdominal incision, stitching the parietal peritoneum to the liver and allowing an interval of 48 hours for adhesions before opening the abscess. If the liver was found adherent firmly to the peritoneum, the

point for drainage was easily located from within, and the abscess immediately opened by an incision opposite this point, with the removal of a section of rib. In one case, we removed a section of rib, opened and sewed off the pleural cavity, split the diaphragm and drained the abscess without post-operative complications.

We have had no instance of peritoneal infection following the abdominal exploration, and we have gained a positive knowledge of the location and the extent of the abscess, which has made it possible to complete the operation, to open and drain the abscess with safety. The only case of peritonitis that we have seen, was the one reported, following the introduction of a needle between the ribs for diagnostic purposes, before coming under our care.

With a hand in the abdomen, the abscess in the liver can always be detected by a characteristic induration of the liver tissue overlying it, with or without fine adhesions to the parietal peritoneum, depending upon the depth of the pus from the surface. Following the incision and exploration (with the whole hand lying flat upon the liver) the field can be isolated with gauze and the abscess aspirated, as the needle is withdrawn, a small gauze trailer packed down to the wall will prevent leakage and preserve a track to the abscess for future guide. The lower end of the wound can then be closed and the field protected with gauze for immediate drainage, or the peritoneum of the upper angle of the wound can be loosened from its abdominal attachment and sewed down to the liver and the wound closed, with the exception of the exposed patch of liver; 48 hours later, the abscess can be opened with long forceps, without anesthetic.

It is to be remembered that the wall of an old liver abscess is very hard and very thick and extremely difficult to penetrate with a blunt instrument, and until such a membrane has been penetrated, the abscess has not been opened. We have never had any bleeding that a gauze pack would not control, even when 5 or 6 inches of liver tissue had to be traversed before the abscess was encountered. The pus is very thick and the caliber of the drainage tube must be large and the walls heavy enough to withstand a good deal of pinching at the point of entrance into the abscess cavity. I prefer the two stage operation whenever possible, because by isolating the small area of liver overlying the abscess from the general peritoneal cavity, it is possible to do away with the large gauze packs and the resulting tedious aftermath of a large infected wound, although I am sure that the general cavity can be protected with gauze and the abscess opened at the time of the original operation with safety to the patient. We have done this whenever a spot on the liver overlying the abscess could not be stitched to the parietal peritoneum.

We have not encountered the difficulty so often described in stitching the peritoneum to the liver, since we gave up trying to bring the liver up to the wound. If the peritoneum be loosened from the fascia for a distance of an inch or an inch

and a half around the margin of the wound, its edges will drop down upon the surface of the liver without tension, and a few catgut sutures will hold the two surfaces together without danger of cutting through the liver tissue. Enough pus can be removed with the aspirator after isolating the field, to relieve the tension and the urgent symptoms, and at the end of 48 hours the liver and peritoneum will have become so firmly adherent as to stand all the manipulations necessary to open and drain the abscess.

We have had none of these patients complain of pain during this second step of the operation, except at the actual time of penetrating the abscess wall, and we have not found it necessary to give a second anesthetic in any case.

To my mind the greatest danger to these patients lies in the tendency of the abscess to perforate through the diaphragm, or for the infection to be carried either by the blood stream or lymphatics to the lung, with the formation of a secondary lung abscess. A cough developing in the course of liver abscess should be an indication for immediate operation, unless it can be attributed plainly to causes other than a beginning lung involvement secondary to the liver infection. Both of our cases of lung abscess following drainage of the liver, had persistent cough and blood tinged sputum with râles at the base before operation, and both died of slowly progressing abscess of the right lung. I am convinced that this complication can be avoided in spite of the close proximity of the lung to the abscess, if the patients are operated upon before the extension has taken place; by placing them in Fowler's position immediately after operation and maintaining this position until the abscess is healed. After the lung has become infected, we have not been able to stay the slow development of this process. An incision through the chest wall directly into the invaded lung in an effort to drain the abscess, in one case, was not successful, because the thick gelatinous contents of the abscess would not drain.

Only two cases of this series had diarrhea or showed ameba in the stools while under our care for the surgical treatment of the liver, although all showed ameba in the pus when the abscess was first evacuated. We were unable to demonstrate any other organisms in stained smears except in the case where a communication between the abscess cavity and the air passages had been made before the operation.

Among the 28 cases observed there was no instance of a double abscess in the liver itself.

Besides the cases of abscess reported, we have seen three cases which we believe to be amebic infection of the liver, recover without surgery. Rest in bed, continuous moist heat and diet being all that was necessary. These three cases seemed to be instances of the condition described by Leonard Rogers, as presupplicative amebic hepatitis.

In conclusion I would urge an abdominal incision rather than an exploratory puncture with needle in all cases of suspected abscess of liver. A negative result with the needle is of no diagnos-

tic value, because of the depth of the abscess, in many instances, and the tendency of the needle to slide along beside the hard abscess wall instead of to penetrate, when inserted blindly. A positive result with the needle on the other hand, may be followed by peritonitis, if the needle be withdrawn, without the possibility of isolating the wound in the liver from the general cavity.

The high abdominal incision through the right rectus can usually be used for drainage as well as exploration; with the abscess high in the right lobe, the tube passing up and back drains the cavity from its most dependent point, especially if the patient be kept in Fowler's position when returned to bed.

Let me call especial attention to the fact that deep liver abscesses do not fluctuate, but can be detected with a hand on the liver surface, by a feeling of induration even through several inches of liver tissue, and that a large percentage of them develop from a focus high in the upper half of the right lobe, at such a point that perforation into the lung is the most probable termination, without surgical interference, and that the mortality of any surgical procedure is greatly increased, after the lung has become involved either by rupture of the abscess through the diaphragm or by extension through the lymphatics or blood stream.

#### Discussion.

Dr. W. V. Brem, Los Angeles: The first point of interest is that 28 cases of liver abscess should have occurred in the practice of one physician in Los Angeles and a second interesting point is that the majority of these cases came to him from Mexico. But a few of the abscesses did develop in the vicinity of Los Angeles. During the past six or seven months I have examined the feces of a number of patients who had amebas in the stools and who acquired them in or near Los Angeles. Amebic infection therefore does occur in that vicinity and the possibility of amebic abscess of the liver should be borne in mind. My experience with liver abscesses were gained in Panama. In Colon Hospital during the four years of my service we had about the same number of liver abscesses that Dr. Smith reported to-day—from 28 to 30. Dr. Smith's mortality was quite low. I think that is explained by the fact that his patients were probably in Mexico a long time before they came to Los Angeles, that is that they were the ones whose resistance was good enough to enable them to take care of the infection well. The others probably died during the acute stage and did not reach Los Angeles. The prognosis of course would be better in the former group of patients whose abscesses had reached the chronic stage with thick fibrous walls. Herrick, of Ancon Hospital, Panama, has classified liver abscesses into acute, subacute and chronic forms. The chronic are those with thick fibrous walls and the mortality is low in this group. In the group of the acute abscesses with thick necrotic walls and no fibrous tissue formation the mortality is high, and the patients die quickly with an extraordinary degree of intoxication usually on the second day after the operation. The condition does not seem therefore to be associated with any secondary infection. I do not know why they have such intense intoxication but one is tempted to think of a rapid absorption of some toxin from the necrotic walls of the abscess. I think Herrick's classification is very useful from the prognostic point of view. In diagnosis it is important too because the symptoms and blood picture in the

various stages is different. In the chronic stage the leukocyte count is considerably lower than in the acute stage and in the differential count the percentage of polymorphonuclear leukocytes is not so greatly above normal. In the acute stage you are liable to find multiple abscesses, while in the chronic stage the abscesses have coalesced or there was only one in the beginning. In Dr. Smith's series the two abscesses of the lung are also interesting. In all the experience in Panama (the number of cases reaching over 200) there were only two cases of abscess of the lung not connected by continuity with an abscess of the liver.

Dr. E. C. Moore, Los Angeles: The presence of amebiasis in the United States is more prevalent than we believe. In a recent conversation with some of my confreres in Los Angeles I learned that amebae had been found in from 20 to 30 cases. It is incumbent upon us throughout the United States to investigate this condition more than we have heretofore.

### MECHANISM AND CLINICAL ASPECTS OF CHRONIC ARTERIAL HYPERTENSION.\*

By R. L. CUNNINGHAM, M. D., Los Angeles.

In the human body the blood within the arterial system is normally under a pressure which varies, at the end of cardiac systole, from 110 to 125 mm. of mercury, as read by the ordinary sphygmomanometer from the brachial artery. This normal, or physiological, tension of the arteries is maintained chiefly by four factors,—(1) The force of the systolic contraction of the heart muscle; (2) The peripheral resistance in the smaller vessels; (3) The elasticity of the vessels through which the blood passes; and, (4) The amount of blood held within the vessels. Two accessory factors may be taken into account in addition to the four just mentioned,—the respiratory movements of the thorax, and the contraction of the skeletal muscles. Venous pressure is dependent upon arterial pressure, modified by certain other factors, and is not related directly to our present subject. We are here concerned with the matter of arterial tension alone, because that side of the circulation is the one most easily studied and also the one which probably gives us the most accurate knowledge of all the phases of the subject.

It is well known that the normal arterial tension varies for different individuals, and that it also varies, within certain more or less restricted limits, for the same individual, being affected by such habitual changes as rest and exercise, ingestion of food and starvation, sleep and mental excitation, etc. These are the so-called physiological variations, being common to all individuals, and they may be considered as without special clinical significance. On the other hand, when a variation from the usual becomes either permanent or very marked in degree, it can no longer be classed as "normal" or "physiological" and is then necessarily of clinical importance. Such "pathological" deviations are of two kinds: hypotension, a lowering of the blood pressure; and hypertension, an elevation of the blood pressure.

Physiological variations in blood pressure are al-

ways due to a transient modification of one or more of the factors mentioned above as controlling intra-arterial tension, and the active causative agent is usually readily discovered. Pathological variations are likewise due to modification of one or more of the same controlling factors, with this difference, that here the action is not merely temporary, but is permanent in its influence, and is not always so readily discoverable. Both classes of deviation in the direction of hypertension are, as a rule, purposeful and conservative. Hypertension has been studied less thoroughly and does not yet possess the clinical interest which attaches to the opposite change.

When does the term hypertension begin to be applicable? It is hardly possible to designate a definite line of demarkation between the normal and the abnormal pressure, but, in a general way, we are inclined to call any reading excessive when it passes 135 mm. of Hg. for we doubt the occurrence of a continued pressure above 130 mm. in a sound individual, it being understood that the normal reading for the instrument used is in the neighborhood of 115 or 120 mm. Obviously hypertension can not exist as an entity, and the discovery of its presence is but a step in the search for a deeper and underlying disturbance of which it is merely one manifestation, and yet we commonly attribute to it certain symptoms, on the ground that they are in large measure dependent upon the elevated pressure. Always the primary cause is one which has affected one or more of the fundamental factors enumerated at the beginning of this brief discussion. We shall therefore consider the accepted explanation for the occurrence of hypertension in a few of its more frequent clinical associations, and later we shall look for the effects of the condition upon those parts of the organism most profoundly influenced by the rise in arterial pressure.

It is undoubtedly in cases of chronic nephritis that we meet with the highest readings of blood pressure, and particularly in that form of nephritis which is variously called "interstitial," or "granular" or the "genuine contracted kidney." Probably everyone has found pressures of 300 mm. or even higher in this group, though lower readings are far more common. The hard pulse has long been recognized in its association with nephritis and was mentioned by Bright in his writings, though he gave no satisfactory explanation of its production or effect. In 1856 Traube gave the question the first special attention, but he erroneously concluded that the rise in arterial pressure was due to the fact,—not really a fact at all,—that in nephritis less fluid is removed from the body by the kidneys and the flow of blood thus impeded by volume, results in an increase in the pressure within the arteries. At a little later date it was suggested that the rise is to be explained upon a purely mechanical basis of obstruction, since the narrowing of a great many small vessels in the kidneys might offer sufficient impediment to the flow of blood to result in elevation of pressure even though the amount of fluid re-

\* Read before the Forty-Second Annual Meeting of the State Society, Del Monte, April, 1912.